

Application No. 09/408,965
Attorney Docket No. 22-0056

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. (Previously Presented) A method synchronizing an earth terminal in a satellite communication network, the method comprising:
- (a) maintaining a downlink symbol counter clocked at a downlink clock rate;
 - (b) determining a downlink symbol count representative of a time of arrival at a satellite of a burst transmitted from an earth terminal;
 - (c) adjusting said downlink symbol counter to correspond to said downlink symbol count;
 - (d) transmitting synchronization bursts from said earth terminal to said satellite in accordance with said downlink symbol counter;
 - (e) determining at said satellite, whether said synchronization bursts received at said satellite are one of early, late, absent, and on time; and
 - (f) reporting in a downlink signal to said earth terminal, a code representing whether said synchronization burst received at said satellite is one of a plurality of early, late, absent and on time.

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2. (Original) The method of claim 1 further comprising extracting a downlink symbol counter clock from said downlink signal.

3. (Original) The method of claim 1 further comprising determining a length L of a propagation path between said satellite and said earth terminal.

4. (Original) The method of claim 3 further comprising determining an initial estimate of said length L .

5. (Original) The method of claim 4 wherein said step of determining an initial estimate of said length L comprises:

- (i) storing an earth terminal location in said earth terminal;
- (ii) providing a satellite position of said satellite to said earth terminal; and
- (iii) determining said initial estimate using said satellite position and said earth

terminal location.

6. (Original) The method of claim 5 wherein said step of providing a satellite position comprises providing a cell bearing the current coordinates of the satellite.

7. (Original) The method of claim 3 further comprising periodically updating the value of said length L .

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8. (Original) The method of claim 7 wherein said step of periodically updating comprises:

- (i) storing an earth terminal location in said earth terminal;
- (ii) updating a satellite position of said satellite with said earth terminal;
- (iii) redetermining said length L using said satellite position and said earth terminal location.

9. (Original) The method of claim 8 wherein said step of updating a satellite position comprises periodically transmitting updated satellite coordinates to said earth terminal.

10. (Original) The method of claim 1 wherein said step of determining a downlink symbol count comprises maintaining a downlink frame counter and multiplying by a number of symbols in said downlink frame.

11. (Previously presented) The method of claim 1 further comprising adjusting said downlink symbol counter to account for changes in a length L of a propagation path ~~between said satellite and said earth terminal.~~

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12. (Original) The method of claim 1 wherein said step of determining a downlink symbol count comprises extracting a downlink frame number from said downlink signal and multiplying by a number of symbols in said downlink frame.

13. (Original) The method of claim 12 further comprising adjusting said downlink symbol counter to account for changes in the length L of a propagation path between said satellite and said earth terminal.

14. (Previously presented) The method of claim 4 further comprising:

- (i) transmitting a communication signal from said earth terminal to said satellite; and
- (ii) receiving a timing error from said satellite.

15. (Original) The method of claim 14 further comprising redetermining said length L using said timing error.

16. (Original) The method of claim 15 further comprising storing said length L in said earth terminal.

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17. (Original) The method of claim 14 wherein said step of transmitting a communication signal comprises transmitting an entry order wire from said earth terminal to said satellite.

18. (Previously presented) The method of claim 1 further comprising:
determining an identification of said earth terminal;
providing said identification of said earth terminal to a network control center;
generating a synchronization channel assignment for said earth terminal;
and
transmitting said synchronization channel assignment to said earth terminal.

19. (Previously presented) The method of claim 18 further comprising adjusting said downlink symbol counter according to a timing error received from said satellite in response to a communication signal transmitted to said satellite from said earth terminal.

20. (Original) The method of claim 19 wherein said step of adjusting comprises:
launching synchronization bursts from said earth terminal to said satellite
in said synchronization channel;

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processing said synchronization bursts to determine an uplink timing error associated with said synchronization bursts;
transmitting said uplink timing error to said earth terminal; and
adjusting the value of said downlink symbol counter according to said uplink timing error.

21. (Original) The method of claim 20 wherein said step of transmitting said uplink timing error comprises transmitting a correction code indicative of said timing error to said earth terminal.

22. (Original) The method of claim 21 wherein said step of transmitting a correction code comprises transmitting a code representing one of an early indication or a late indication.

23. (Original) The method of claim 21 wherein said step of transmitting a correction code comprises transmitting a multi-bit code representing one of an early indication, a late indication, or an absent indication.

24. (Original) The method of claim 21 wherein said step of transmitting a correction code comprises transmitting a code representing one of an early indication, a late indication, an absent indication, or an on time indication.

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25. (Original) The method of claim 19 further comprising storing said timing error.

26. (Original) The method of claim 25 further comprising, upon re-entry of said earth terminal, adjusting said downlink symbol counter to account for said length L and said stored timing error.

27. (Previously Presented) A synchronization method for a satellite communication network, the method comprising:

- (a) establishing a communication satellite in orbit;
- (b) establishing an earth terminal in communication with said satellite;
- (c) generating a master clock on said satellite;
- (d) transmitting downlink symbols synchronously with said master clock from said satellite to said earth terminal;
- (e) maintaining at said earth terminal a downlink symbol counter clocked at a downlink clock rate;
- (f) determining a downlink symbol count representative of a time of arrival of a burst transmitted from an earth terminal to a satellite;
- (g) adjusting said downlink symbol counter to correspond to said downlink symbol count upon receipt of a predetermined reference point in a downlink frame;

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(h) transmitting synchronization bursts from said earth terminal to said satellite in accordance with said downlink symbol counter;

(i) determining at said satellite, whether said synchronization bursts received at said satellite are one of early, late, absent, and on time; and

(j) reporting in a downlink signal to said earth terminal, a code representing whether said synchronization burst received at said satellite is one of a plurality of early, late, absent and on time.

28. (Original) The method of claim 27 further comprising extracting a downlink symbol counter clock from said downlink signal.

29. (Original) The method of claim 27 further comprising determining a length L of a propagation path between said satellite and said earth terminal.

30. (Original) The method of claim 29 further comprising determining an initial estimate of said length L.

31. (Original) The method of claim 30 wherein said step of determining an initial estimate of said length L comprises:

- (i) storing an earth terminal location in said earth terminal;
- (ii) providing a satellite position of said satellite to said earth terminal; and

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(iii) determining said initial estimate using said satellite position and said earth terminal location.

32. (Original) The method of claim 31 wherein said step of providing a satellite position comprises providing satellite ephemeris data.

33. (Original) The method of claim 30 further comprising periodically updating the value of said length L.

34. (Original) The method of claim 33 wherein said step of periodically updating comprises:

- (i) storing an earth terminal location in said earth terminal;
- (ii) updating a satellite position of said satellite with said earth terminal;
- (iii) redetermining said length L using said satellite position and said earth terminal location.

35. (Original) The method of claim 34 wherein said step of updating a satellite position comprises periodically transmitting updated satellite coordinates to said earth terminal.

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36. (Original) The method of claim 27 wherein said step of determining a downlink symbol count comprises maintaining a downlink frame counter and multiplying by a number of symbols in said downlink frame.

37. (Previously presented) The method of claim 27 further comprising adjusting said downlink symbol counter to account for a length L of a propagation path between said satellite and said earth terminal.

38. (Original) The method of claim 27 wherein said step of determining a downlink symbol count comprises extracting a downlink frame number from said downlink signal and multiplying by a number of symbols in said downlink frame.

39. (Original) The method of claim 38 further comprising adjusting said downlink symbol counter to account for a length L of a propagation path between said satellite and said earth terminal.

40. (Previously presented) The method of claim 30 further comprising:
transmitting a communication signal from said earth terminal to said satellite; and
receiving a timing error from said satellite.

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41. (Original) The method of claim 40 further comprising redetermining said length L using said timing error.

42. (Original) The method of claim 41 further comprising storing said length L in said earth terminal.

43. (Original) The method of claim 40 wherein said step of transmitting a communication signal comprises transmitting an entry order wire from said earth terminal to said satellite.

44. (Previously presented) The method of claim 27 further comprising:
determining an identification of said earth terminal;
providing said identification of said earth terminal to a network control center;
generating a synchronization channel assignment for said earth terminal;
and
transmitting said synchronization channel assignment to said earth terminal.

45. (Previously presented) The method of claim 44 further comprising adjusting said downlink symbol counter according to a timing error received from said

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satellite in response to a communication signal transmitted to said satellite from said earth terminal.

46. (Original) The method of claim 45 wherein said step of adjusting comprises:

launching synchronization bursts from said earth terminal to said satellite in said synchronization channel;

processing said synchronization bursts to determine an uplink timing error associated with said synchronization bursts;

transmitting said uplink timing error to said earth terminal; and

adjusting the value of said downlink symbol counter according to said uplink timing error.

47. (Original) The method of claim 46 wherein said step of transmitting said uplink timing error comprises transmitting a correction code indicative of said timing error to said earth terminal.

48. (Original) The method of claim 47 wherein said step of transmitting a correction code comprises transmitting a code representing one of an early indication or a late indication.

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49. (Original) The method of claim 47 wherein said step of transmitting a correction code comprises transmitting a multi-bit code representing one of an early indication, a late indication, or an absent indication.

50. (Original) The method of claim 47 wherein said step of transmitting a correction code comprises transmitting a code representing one of an early indication, a late indication, an absent indication, or an on time indication.

51. (Original) The method of claim 45 further comprising storing said timing error.

52. (Original) The method of claim 51 further comprising, upon re-entry of said earth terminal, adjusting said downlink symbol counter to account for said length L and said stored timing error.

53. (Currently Amended) A method synchronizing an earth terminal in a satellite communication network, the method comprising:
transmitting synchronization bursts from an earth terminal to a satellite in accordance with [[said]] a downlink symbol counter;
determining at said satellite, whether said synchronization bursts received at said satellite are one of early, late, absent, and on time; and

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reporting, to said earth terminal, a code representing whether said synchronization burst received at said satellite is one of a plurality of early, late, absent and on time.

54. (Original) A system for synchronizing an earth terminal with a satellite in a communication network, said system comprising:

an earth terminal transmitting a synchronization burst to a satellite; and

a satellite receiving said synchronization burst, determining whether said synchronization burst is one of early, late, absent, and on time, and reporting, to said earth terminal, a code representing whether said synchronization burst received at said satellite is one of a plurality of early, late, absent and on time.

55. (Original) A system for synchronizing an earth terminal with a satellite in a communication network, said system comprising:

an earth terminal transmitting a synchronization burst to a satellite; and

a satellite receiving said synchronization burst, determining whether said synchronization burst is one of early and late, and reporting, to said earth terminal, a code representing whether said synchronization burst received at said satellite is one of early and late.